

11/24/2003

15:10

HITT GAINES, PC + 17039729306

NO. 441 D006

17. (Previously Presented) The method as recited in Claim 15 wherein diffusing the second dopant includes diffusing a P-type dopant having an implant dose about 100 times higher than an implant dose of the first dopant.

18. (Original) The method as recited in Claim 15 further including placing a heavy concentration of the first dopant in a region adjacent a source side of the gate, and in the lightly-doped source/drain region adjacent a drain side of the gate.

19. (Original) The method as recited in Claim 18 wherein placing includes placing the heavy concentration of the first dopant in the lightly-doped source/drain region a distance ranging from about 2000 nm to about 3000 nm from the drain side of the gate.

20. (Original) The method as recited in Claim 18 wherein placing includes placing an implant dose of the first dopant ranging from about $1E15$ atoms/cm 2 to about $1E16$ atoms/cm 2 .

REMARKS/ARGUMENTS

The Applicant has carefully considered this application in connection with the Examiner's Action and respectfully requests reconsideration of this application in view of the following remarks.

The Applicant originally submitted Claims 1-20 in the application. Presently, the Applicant has neither amended, canceled nor added any claims. Accordingly, Claims 1-20 are currently pending in the application.

I. Objection Under 35 U.S.C. §132

The Examiner has objected to the amendment filed on July 8, 2003, under 35 U.S.C. §132 because it allegedly introduces new matter into the disclosure. More specifically, the Examiner objects to the amendment because the Applicant added the term "only" into Claims 1 and 11, which the Examiner argues has no support in the specification. The Applicant respectfully disagrees with the Examiner that the term "only" is not supported by the specification. As the Examiner is well aware, the FIGUREs make up a portion of the specification and disclosure. FIGURE 3, and its associated description, discloses that the lightly-doped source/drain region 310 comprises only a first dopant. Further, FIGURE 3, and its associated description, makes no mention that the lightly-doped source/drain region 310 comprises anything other than only a first dopant. Accordingly, the Applicant requests the Examiner to withdraw this objection.

II. Rejection of Claims 1 and 11 under 35 U.S.C. §112

The Examiner has rejected Claims 1 and 11 under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor, at the time the application was filed, had possession of the claimed invention. Namely, the Examiner argues that the term "only" is not supported by the original specification. As established above with respect to the objection, the term "only" is definitely supported by the original specification. Accordingly, the Applicant requests the Examiner withdraw this §112 rejection.

III. Rejection of Claims 1-3, 5, 6, 8, 10, 11-13, 15, 16, 18, and 20 under 35 U.S.C. §102.

The Examiner has rejected Claims 1-3, 5, 6, 8, 10, 11-13, 15, 16, 18, and 20 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,255,154 B1 to Akaishi, *et al.* (Akaishi). Presently, independent Claims 1 and 11 include the elements of forming a lightly-doped source/drain region using only a first dopant and then creating a gate over the lightly-doped source/drain region. In contrast to the Examiner's beliefs, Akaishi fails to teach such an element, and moreover, fails to do so for more than one reason.

Akaishi is directed to method of manufacturing a semiconductor device which can satisfy the requirements of reduced "on" resistance. Initially, it should be noted that what the Examiner believes is an LDD region is actually a drift region 22. As discussed at column 4, lines 15-18, "the N-type impurities serve to form an N layer 22 constituting a drift region in later steps." Therefore, layer 22 does not constitute a lightly doped source/drain region but a drift region.

In actuality, Akaishi specifically teaches that its LDD structures are formed after formation of the gate 7A, however, prior to forming the side wall spacers 36. (See, FIGURES 6-8 and associated description at column 6, lines 13-50). This step is in direct contrast to what is presently claimed in independent Claims 1 and 11. As recited above, independent Claims 1 and 11 require that the gate be created over the lightly-doped source/drain regions. By nature, this requires that the lightly-doped source/drain regions be formed prior to formation of the gate. Such is clearly not the case in the Akaishi reference.

However, assuming arguendo that the drift region of Akaishi could be considered a lightly-doped source/drain region, it requires both an Arsenic 32 and Phosphorous 33 dopant for creation thereof. (See, column 4, lines 9-22, FIG. 2 of the Akaishi reference) Akaishi then states that

"[t]hese N-type impurities serve to form an N layer 22 constituting a drift region in later steps." (See, column 4, lines 15-17, FIG. 2 of the Akaishi reference) As Akaishi requires at least two dopants to form its drift region and Claims 1 and 11 require that only a single first dopant be used for the formation of its lightly-doped source/drain regions, Akaishi fails to teach this element.

The Examiner is attempting to parse the drift region 22 into portions 22A and 22B by arguing that Akaishi teaches forming lightly doped source/drain region 22A with only a first dopant (in this case, the dopant only having N-type conductivities and the only dopant is the N-type dopant). As regions 22A and 22B collectively form the drift region 22, if 22A were to function as a lightly doped source/drain region, 22B would also function as a lightly doped source/drain region. Therefore, the lightly doped source/drain region 22 of Akaishi, if it could be called that, would comprise at least two dopants. As indicated above, this is contrary to that presently claimed in independent Claims 1 and 11.

Therefore, Akaishi does not disclose each and every element of the claimed invention and as such, is not an anticipating reference. Because Claims 2-3, 5, 6, 8, 10, 12-13, 15, 16, 18, and 20 are dependent upon Claims 1 and 11, Akaishi also cannot be an anticipating reference for Claims 2-3, 5, 6, 8, 10, 12-13, 15, 16, 18, and 20. Accordingly, the Applicant respectfully requests the Examiner to withdraw the §102 rejection with respect to these Claims.

IV. Rejection of Claims 4, 7, 9, 14, 17, and 19 under 35 U.S.C. §103

The Examiner has rejected Claims 4, 7, 9, 14, 17, and 19 under 35 U.S.C. §103(a) as being unpatentable over Akaishi. As established above, Akaishi fails to teach each and every element of independent Claims 1 and 11. Similarly, Akaishi fails to suggest each and every element of

independent Claims 1 and 11. As Akaishi specifically teaches that its drift region is formed using at least two dopant types, Akaishi fails to suggest that only a single first dopant be used for the formation of its lightly-doped source/drain regions, as required by independent Claims 1 and 11.

Thus, Akaishi fails to teach or suggest the invention recited in independent Claims 1 and 11 and their dependent claims, when considered as a whole. Accordingly, it fails to establish a prima facie case of obviousness with respect to Claims 4, 7, 9, 14, 17, and 19. Claims 4, 7, 9, 14, 17, and 19 are therefore not obvious in view of Akaishi.

In view of the foregoing remarks, the cited reference does not support the Examiner's rejection of Claims 4, 7, 9, 14, 17, and 19 under 35 U.S.C. §103(a). The Applicant therefore respectfully requests the Examiner withdraw the rejection.

V. Conclusion

In view of the foregoing remarks, the Applicant now sees all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicits a Notice of Allowance for Claims 1-20.

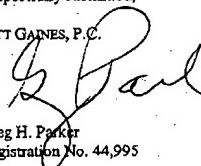
11/24/2003 15:18 HITT GAINES, PC + 17038729306

NO. 441 0011

The Applicant requests the Examiner to telephone the undersigned attorney of record at
(972) 480-8800 if such would further or expedite the prosecution of the present application.

Respectfully submitted,

HITT GAINES, P.C.



Greg H. Parker
Registration No. 44,995

Dated: 11-24-03

P.O. Box 832570
Richardson, Texas 75083
(972) 480-8800